

MASTER OF ELECTRICAL ENGINEERING EXAMINATION, 2018

(1st Year, 2nd Semester)

HIGH VOLTAGE MEASUREMENTS

Time: Three Hours

Full Marks: 100

Answer any Five Questions

1. a) Draw the circuit diagram of a peak voltmeter that contain a bleeder resistance. Describe the principle of operation of such a peak voltmeter and discuss about the errors associated with peak voltage measurement. 10
- b) Explain how a sphere gap can be used to measure the peak value of high voltage. What are the parameters and factors that influence such voltage measurement? 10
2. a) Briefly explain the operation of Klydonograph with suitable diagram. What is the significance of 'Lichtenberg figures' in lightning impulse voltage measurement. 12
- c) Explain the techniques of impedance matching for the measurement of high voltage surge with respect to both divider end and oscilloscope end. 8
3. Explain what you mean by apparent charge. Why the concept of apparent charge has to be introduced in measuring partial discharge? Describe an experimental setup for partial discharge measurement from a sample? 20
4. a) Briefly explain the construction and the working principle of Generating voltmeter with a neat diagram. Also mention the advantage and limitations of this voltmeter. 14
- b) A generating voltmeter is read 250 kV with an indicating meter having a range of (0 - 20) μA . Calculate the capacitance of the generating voltmeter when the driving motor rotates at a constant speed of 1500 RPM. 06
5. a) Briefly explain the operation of Schering Bridge for both grounded and ungrounded test object. 12
- b) An AC Schering bridge was made up as follows:
 Arm AB, a capacitor of 0.00125 μF in parallel with 3.18 $\text{k}\Omega$ resistance, BC a resistance of 636 Ω , arm CD an unknown capacitor C_x and R_x in series, arm DA a capacitance of 100 pF. Determine the value of capacitance C_x , resistance R_x and dissipation factor. 08
6. a) Explain the different types of divider are used in high voltage measurement. Discuss their advantage and limitations. 12
- b) Describe the measurement procedure of high impulse current by a Rogowski Coil. 08

7. Write short notes on:

10x2

(i) Capacitive Voltage Transformer (CVT)

(ii) Electrostatic voltmeter.

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